



2013 Aerial Survey Results

Questions and Answers

For further information on forest health conditions in the Rocky Mountain Region, visit <http://www.fs.usda.gov/main/r2/forest-grasslandhealth>

Q: What is the current state of the mountain pine beetle epidemic?

A: Mountain pine beetle has affected 3.4 million acres in Colorado since 1996; the epidemic has slowed substantially in most areas of Colorado. This year the affected area only expanded by 8,000 acres, compared to 31,000 acres 2012 and 140,000 acres in 2011. This is due to the supply of mature lodgepole pine trees having been depleted in the core of the outbreak areas. Although some spread is still occurring on the Front Range and in the peripherals of the core outbreak areas, the slowed growth rate illustrates that the epidemic is in decline.

Q: What do forest visitors need to know when they see these dead trees while visiting National Forests?

A: The national forests continue to be great places to experience the outdoors, but visitors must exercise caution when recreating. Bark beetle-affected trees pose a safety hazard to the general public. Live, dead or "red" (Pine trees attacked by mountain pine beetle turn red the year following attack and fade to gray as needles fall) trees can fall at any time without warning because of shallow roots. To reduce the risk, stay away from areas with dead trees on windy days. Immediately move to an open area if it gets windy while in the forest. The best defense is to be aware of surroundings and weather conditions. Do not recreate or camp within falling distance of dead trees regardless of the weather conditions.

Q: What is being done to manage the areas affected by mountain pine beetle?

A: Safety of the public and our employees and mitigating the effects of the outbreak are top priorities for the Rocky Mountain Region. The USFS utilizes partnerships and innovative stewardship contracts to improve safety, forest resiliency and accelerate forest recovery. Mitigation efforts, including the removal dead and diseased trees, are taking place across the region.

Q: What can be done with the trees removed from the forest?

A: Because of stewardship contracting and continued collaboration among the USFS and local communities, the forest products industry is in a better position these days as additional mills come on line to take advantage of trees being removed from forested lands in Colorado. The Forest Service is working to provide a reliable and predictable supply of material to plants such as the new Gypsum Biomass plant.

Q: Why is Colorado experiencing a spruce beetle epidemic?

A: The spruce beetle outbreak that is affecting many of the mature spruce forests in southern Colorado is a natural event that will change the appearance of the forest for some time to come. Spruce beetle and spruce trees have evolved together. The primary disturbance agent for high elevation mature spruce trees is spruce beetle. This relationship results in the death of old stands and the initiation of new stands.

Spruce beetle infestation in mature spruce stands generally happen after mature spruce trees are blown down after a high wind event. Spruce beetles are attracted to the weakened, fallen trees; they bore into them and begin to reproduce. The more "blow down" that occurs the more



opportunity is provided to the spruce beetle to build up high populations. Drought combined with windthrown trees in the early 2000's exacerbated the problem and huge populations of beetles were able to develop.

Once the populations of spruce beetles have built up in the fallen trees, the stressed trees surrounding them offer little resistance to attack. The warmer weather allowed more of beetles to survive winter and may have allowed some beetles to complete their life cycle in one year rather than the typical two years. Consequently, the beetle flight (when new adult beetles emerge and fly from dead trees) in the last couple of summers has been the largest witnessed by entomologists in decades.

Q: How is Spruce beetle different from Mountain Pine beetle?

A: The two beetles are closely related, are both native to Colorado, and although there are subtle differences in the range of size and color of these beetles, these characteristics can overlap. The major difference is in their behavior and in the tree species that they attack. Spruce beetles attack Engelmann and blue spruce trees and mountain pine beetles attack lodgepole, ponderosa and limber pines in Colorado.

Q: What areas of Colorado will be most affected by Spruce Beetle?

- **A:** Since 1996, spruce beetle has affected 1,144,000 acres in Colorado. Spruce beetle has affected areas on both federal and private lands. Spruce beetle activity was detected on 398,000 acres in Colorado in 2013. Of these, 216,000 acres are in areas not previously mapped as having spruce beetle activity (new acres). This increase in activity is indicative of a rapidly expanding outbreak. In some areas, the outbreak has moved through entire drainages in the course of one year.

Expanding outbreaks are occurring in and around:

- Southern Colorado on the Rio Grande, San Juan and Gunnison National Forests (NF);
- the Grand Mesa NF, the San Isabel NF;
- some activity continues on the White River; and
- In northern Colorado spruce beetle caused new tree mortality along the Medicine Bow and Rabbit Ears Mountains and is active in Grand, Jackson and Larimer counties. Much of this activity is found from Cameron pass to Willow Creek pass and west along the Rabbit Ears Range.

Q: What can Colorado expect to see in spruce beetle affected forests over the next few years?

A: Spruce beetle mortality can take more than a year to become obvious. Trees attacked in the previous year are still green. Bark flakes lying on the snow from woodpecker feeding may be the most obvious sign of attack on these trees. Older hit trees appear a lighter or yellowish green and as needles fall the standing dead trees have a brownish cast to their tree crowns. Trees that have root rots or heart rots are typically the first to fall, split or break. Some large green trees that were not killed by beetles may also be blown over by wind as their canopies are no longer protected by neighboring live tree canopies.

Q: What can be done to manage the spread of Spruce beetle?

A: While these large disturbance events result in the death of large numbers of trees over vast areas, the removal of the old stands paves the way for new trees in a continual process of succession. In a similar manner, these large disturbances catalyze management activities in an effort to restore forested areas and maintain resiliency within the ecological system. Forest Service



response has been rapid, and utilizes many management tools. Some examples of Forest Service responses include:

- Campground remediation and recovery which includes the removal of the dead overstory trees to provide a safer environment for the public and to allow growing space for the still living tree and planting a variety of new trees to accelerate their revegetation;
- Using flexible timber sale contracts to allow for the inclusion of newly infested trees within an existing timber sale area; and
- Using service contracts to remove “trap trees” (mature spruce trees that are intentionally felled to draw spruce beetles to infest a particular site) before the adults can emerge thereby reducing the population.

Q: Do beetle-affected trees pose a greater fire danger?

A: The relationship between bark beetles and wildfire is complex and varies by location, habitat types, the intensity of the attack and time since the attack. Generally speaking, crown-and surface-fire hazard change with time following outbreaks, and factors such as weather and forest composition play large roles in determining whether and how intensely a fire will burn.¹

Research tells us that at the stand level, both crown and surface-fire hazards² change through time after a bark beetle outbreak in a stand of living trees³. The fire hazard is high in the period one to two years after pine trees die since the dead needles are retained in the tree’s crown, stocking the canopy with dry, fine fuels that can ignite quickly during weather conditions conducive to fire.⁴ As the trees lose their needles, the fire risk in the crowns of the trees decreases as fire doesn’t spread through standing dead trees with no needles very quickly. Surface fire hazard increases again as dead trees begin to fall and create a heavy fuel bed with young trees growing up through the tangle of down logs⁵.

For more information about insects and diseases in our Region, please visit our [Forest Health Protection website](#).

¹ Bentz, et. al. (2009) Bark Beetle Outbreaks in Western North America: Causes and Consequences, Bark Beetle Symposium, Snowbird, Utah.

² The term Fire hazard as used here refers specifically to the state of fuels in a given stand – independent of variables such as temperature, wind, and precipitation that influence fuel moisture content and fire occurrence.

³ Bentz, et. al. (2009) Bark Beetle Outbreaks in Western North America: Causes and Consequences, Bark Beetle Symposium, Snowbird, Utah.

⁴ Page, W.; Jenkins, M. 2007. Mountain pine beetle-induced changes to selected lodgepole pine fuel complexes within the intermountain region. *Forest Science* 53(4):507-518.

Page, W.; Jenkins, M. 2007. **Predicted Fire Behavior in Selected Mountain Pine Beetle–Infested Lodgepole Pine**. *Forest Science* 53(6):662-674

Hawkes, B. 2008. Effects of the mountain pine beetle on fuels and fire behaviour. *In* Mountain Pine Beetle: From Lessons Learned to Community-based Solutions Conference Proceedings, June 10–11, 2008. *BC Journal of Ecosystems and Management* 9(3):77–83.
http://www.forrex.org/publications/jem/ISS49/vol9_no3_MPBconference.pdf

Jenkins, M., Hebertson E., Page, W. and Jorgensen C. 2008 Bark beetles, fuels, fires and implications for forest management in the Intermountain West. *Forest Ecology and Management* 254 (2008) 16–34

⁵ Bentz, et. al. (2009) Bark Beetle Outbreaks in Western North America: Causes and Consequences, Bark Beetle Symposium, Snowbird, Utah.